SHORELINE and WETLAND RESTORATION PLAN

Restoration Summary.

Land clearing and shoreline stabilization activities associated with the Lakeshore Village project caused the unauthorized impact by fill of approximately 0.25 acre of wetland through placement of riprap for shoreline stabilization. Approximately 168 square feet of riprap was placed within the legal lake elevation of 692.9. WPM Construction, LLC proposes to restore the disturbed shoreline and wetland area to original grade and contours per the following restoration plan.

Riprap placed along the shoreline will be removed to an on-site upland area for disposal. The lakeshore within the limits of this work will be re-established utilizing bioengineering techniques for bank stabilization. Pre-vegetated coir roll will be placed along the shoreline at or about the legal lake elevation. The pre-vegetated coir roll will provide a stable and vegetated lake edge. Woody vegetation that was mechanically cleared and windrowed within the wetland will be removed to an on-site upland disposal area. Soil disturbed by the mechanized land clearing will be returned to previous grade and reseeded.

The wetland area shall be reseeded with a Midwestern Sedge Meadow Wetland Mix (WP2). This mix is intended for restoration sites where soil and hydrologic conditions are relatively stable. The mix is designed for sites with saturated soils for long duration with exposure to full sun where a low profile, water tolerant vegetative cover is desired.

Implementation Plan.

Responsible parties. WPM Construction, LLC , 1000 East 80th Place, Suite 700 North, Merrillville, Indiana 46410, shall be responsible for contracting with the appropriate earthwork and landscape contractors to ensure success of the restoration.

Site Preparation. Restoration grading, seeding and planting will occur upon approval of the restoration plan and issuance of all required permits for the proposed work. In the event that inclement weather or unsuitable soil conditions delay seeding (allowing the establishment of undesirable noxious species), a limited program of site-specific herbicide application using Round-up/Rodeo brand herbicide may be requested. The herbicide will be spot or wick applied only to select, undesirable noxious species to allow the planting schedule to resume according to the restoration plan.

Planting Plan. The Lakeshore Village Shoreline Restoration Plan indicates the extent and specification of the restoration areas. The emergent shoreline areas (approximately 0.64 acre) will be reseeded with a mix comprised minimally of the following species prepared by Heartland Restoration Services, Inc.:

Midwestern Sedge Meadow Mix (WP2)

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This mix is intended for restoration sites where soil conditions and hydrologic conditions are relatively stable. The mix is designed for sites with saturated soils for long durations and exposure to full sun. The mix may be interseeded to add diversity on constructed sites where vegetation has stabilized the site. Approximate mix weight/acre 36 LBS; 40.0% Graminoides 35.2% Forbs, 24.8% temporary cover grasses.

Scientific Name	Common Name	Indicator status	Habit
Graminoides			
Calamagrostis canadensis	Blue Joint Grass	OBL	PNG
Carex comosa	Bearded Sedge	OBL	PNEGL
Carex crinita	Fringed Sedge	FACW+	PNEGL
Carex cristatella	Crested Sedge	FACW+	PNGL
Carex frankii	Frank's Sedge	OBL	PNEGL
Carex granularis	Meadow Sedge	FACW+	PNGL
Carex lupulina	Hop Sedge	OBL	PNEGL
Carex lurida	Shallow Sedge	OBL	PNEGL
Carex stipata	Stalk Grain Sedge	OBL	PNGL
Carex tribuloides	Blunt Broom Sedge	FACW+	PNGL
Carex vulpinoidea	Fox Sedge	OBL	PNEGL
Eleocharis palustris	Creeping Spike Rush	OBL	PNEGL
Juncus effusus	Soft Rush	OBL	PNEGL
Leersia oryzoides	Rice Cut Grass	OBL	PNG
Panicum virgatum	Switch Grass	FAC+	PNG
Scirpus atrovirens	Dark Green Bulrush	OBL	PNEGL
Scirpus cyperinus	Woolgrass	OBL	PNEGL
Scirpus pendulus	Drooping Bulrush	OBL	PNEGL
Scirpus validus	Softstem Bulrush	OBL	PNEGL
Spartina pectinata	Prairie Cord Grass	FACW+	PNG
Forbs			
Alisma subcordatum	Subcordate Water Plantain	OBL	PNEF
Asclepias incarnata	Swamp Milkweed	OBL	PNF
Aster novae-angliae	New England Aster	FACW	PNF
Aster puniceus	Swamp Aster	OBL	PNF
Aster puniceus firmus	Shining Aster	FACW+	PNF
Bidens cernua	Nodding Beggar-Ticks	OBL	AIF
Eupatorium maculatum	Spotted Joe Pye Weed	OBL	PNF
Eupatorium perfoliatum	Common Boneset	FACW+	PNF
Helenium autumnale	Common Sneezeweed	FACW+	PNF
Iris virginica shrevei	Blue Flag Iris	OBL	PNF
Lobelia cardinalis	Cardinal Flower	OBL	PNF
Lobelia siphilitica	Great Blue Lobelia	FACW	PNF
Ludwigia alternifolia	Bushy Seedbox	OBL	PNEF
Mimulus ringens	Alleghany Monkey Flower	OBL	PNF
Penthorum sedoides	Ditch Stonecrop	OBL	PNF
Scientific Name	**Common NameIndicator status**		**Habit**

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Forbs			
Physostegia virginiana	Obedient Plant	FACW	PNF
Sagittaria latifolia	Broad-Leaf Arrowhead	OBL	PNEF
Senna hebecarpa	Wild Senna	FACW	PNF
Solidago riddellii	Riddell's Goldenrod	OBL	PNF
Thalictrum dasycarpum	Purple Meadow Rue	FACW-	PNF
Verbena hastata	Blue Vervain	FACW+	PNF
Vernonia gigantea	Tall Ironweed	FAC	PNF
Temporary Cover Grasses			
Agrostis alba palustris	Creeping Bentgrass	FACW	PNG
Avena sativa	Seed Oats	FACU*	

In preparation for seeding, the contractor will prepare the seed bed by discing and/or culti-mulching any compacted areas. The seed will be applied following seedbed preparation in late spring or early summer, until June 30th. The methods of seed application may include (in order of preference) drilling with a Rangeland-type grass seed drill; broadcasting by hand or dropping from a dropseeder followed by incorporation by culti-packing; or hydroseeding using a trace amount of fiber mulch in solution. Between July 1 and September 15, seed may be applied in the above manner provided that the site is irrigated by sprinkling to ensure proper germination and establishment. Between September 16 and freeze-up, seed may be applied as in the spring. After freeze-up, seed may only be applied by drilling with a Rangeland-type grass seed drill.

The following woody tree and shrub species shall be planted within the northeast portion of the restored wetland (approximately 0.88 acre) in the addition to the sedge meadow seed mix along the eastern shoreline of the property.

Tree and Shrub Planting			
Acer rubrum	Red Maple	FAC	NT
Betula nigra	River birch	FACW	NT
Cephalanthus occidentalis	Button Bush	OBL	NS
Cornus stolonifera	Red-osier Dogwood	FACW	NS
Platanus occidentalis	American sycamore	FACW	NT
Quercus bicolor	Swamp White Oak	FACW+	NT
Quercus palustris	Pin Oak	FACW	NT
Sambucus canadensis	American Elderberry	FACW-	NS

Planting is to occur in the late spring, summer, or fall of the year. No single planted woody specie may comprise greater than 20% of the total planted species, unless approved by ACOE, IDNR and IDEM. The woody species will be planted in random, 8-12 feet apart (360 stems per acre). All woody plants shall be containerized seedling stock if available. All woody plant material will be purchased from grower-nurseries located within the Midwest region and of similar latitude (hardiness zone). Tree and

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shrubs shall be a minimum of 1-4 feet tall. All woody plants will be planted in holes large enough to accommodate the root mass. Slow-release fertilizer tablets will be placed within the planting hole of each woody plant at the time of planting.

Schedule. The wetland restoration work shall begin upon formal approval of the restoration plan and permits from ACOE, IDNR and IDEM ("regulatory agencies") in the affected wetland areas and shall proceed as follows:

1. Place/maintain all temporary sediment fencing.
2. Restore wetlands to their original contours, replacing the top 6" to 12" with topsoil.
3. Remove riprap from shoreline to an appropriate upland site.
4. Remove fill and windrowed vegetation to an appropriate upland site.
5. Install pre-vegetated coir roll along shoreline.
6. Perform seeding and planting as specified.
5. Remove temporary sediment fence after all disturbed areas have been successfully re-vegetated.

Minimum Success Criteria.

- The area of restored wetland, as measured by wetland delineation, must meet or exceed the agreed acreage of forested and emergent wetland restoration required.
- Coir roll will be placed along the shoreline shall be stable and vegetated. Failed coir bank stabilization will be replaced with coir or alternative bioengineered bank stabilization measure approved by ACOE, IDNR and IDEM.
- Greater than 50% of the dominant vegetation species must have a wetland indicator of FAC (i.e., facultative) or wetter.
- The hydrology at the mitigation wetland site must meet the wetland hydrology criteria contained in the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January, 1987).
- The combined surface areal coverage of *Phalaris arundinacea* (reed canary grass) and *Typha spp.* (cattail) shall not exceed 15% of the restored wetland areas.
- The restored wetland areas are free of the following exotic species: *Lythrum salicara* (purple loosestrife), *Phragmites australis* (common reed), and *Myriophyullum spicatum* (water milfoil).
- Native plant species, excluding *Typha spp.* (cattail), must have an areal cover of at least 50% in inundated tree or shrub, and shallow emergent communities.
- No more than 10% of the surface area coverage of the restored wetland areas may be open water, bare ground, or a combination of the two. Open water and bare ground are defined as areas with less than 10% areal vegetative cover.
- For the 0.88 acre forested area, the average density of live individuals of woody species shall be at least 200 stems per acre.
- For the 0.88 acre forested area, volunteer woody vegetation may be counted, excluding *Acer saccharinum* (silver maple), *Populus deltoides* (cottonwood),

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Rhamnus frangula (glossy buckthorn) *and/or Salix exigua* (willow). Total volunteers may not account for greater than 50% of the performance success criteria.

Monitoring/Wetland Delineation Report.

The restored wetland must be monitored one year after restoration grading and planting. The monitoring period will commence with notice to the regulatory agencies that planting of the restoration area has been completed. Monitoring of the restored wetland areas will begin during the first post-restoration growing season (June-August). A wetland delineation shall be performed and a brief report submitted on the aforementioned success criteria by December 31, of the first post-restoration growing season. The wetland delineation will consist of visual and quantitative observations of hydrology, soils, and vegetation sampling. The reports shall contain information concerning what steps the applicant has taken to restore the shoreline and wetlands and whether the areas are achieving the success criteria outlined in Minimum Success Criteria. To be released from further monitoring, the restored areas must meet the success criteria listed above. The report shall include the following:

a) The IDNR, IDEM and ACOE identification number.
b) Restoration plans.
c) Discussion of hydrology at the restored wetland sites.
d) Discussion of plant community development at the restored wetland sites.
e) Discussion of methods or means used to determine compliance with the success criteria.
f) Photographs representative of the restored sites.
g) Identification of any problems with meeting the success criteria.
h) Recommendations for correcting any problems identified.
i) Wetland delineation for the mitigation wetlands in the final report.

If after one year the restored wetland areas fail to meet the success criteria above, then corrective actions may be required. These corrective actions may include additional grading, planting, or other actions deemed necessary by regulatory agencies to meet the success criteria. Corrective actions may include extended monitoring to verify the effectiveness of the corrective action. Extended monitoring may constitute the sole corrective action if the regulatory agencies believe that the site needs more time to meet the success criteria. Once the permittee believes the site meets or exceeds all of the success criteria listed below, the permittee may submit a proposed final monitoring report to the regulatory agencies and suspend monitoring.

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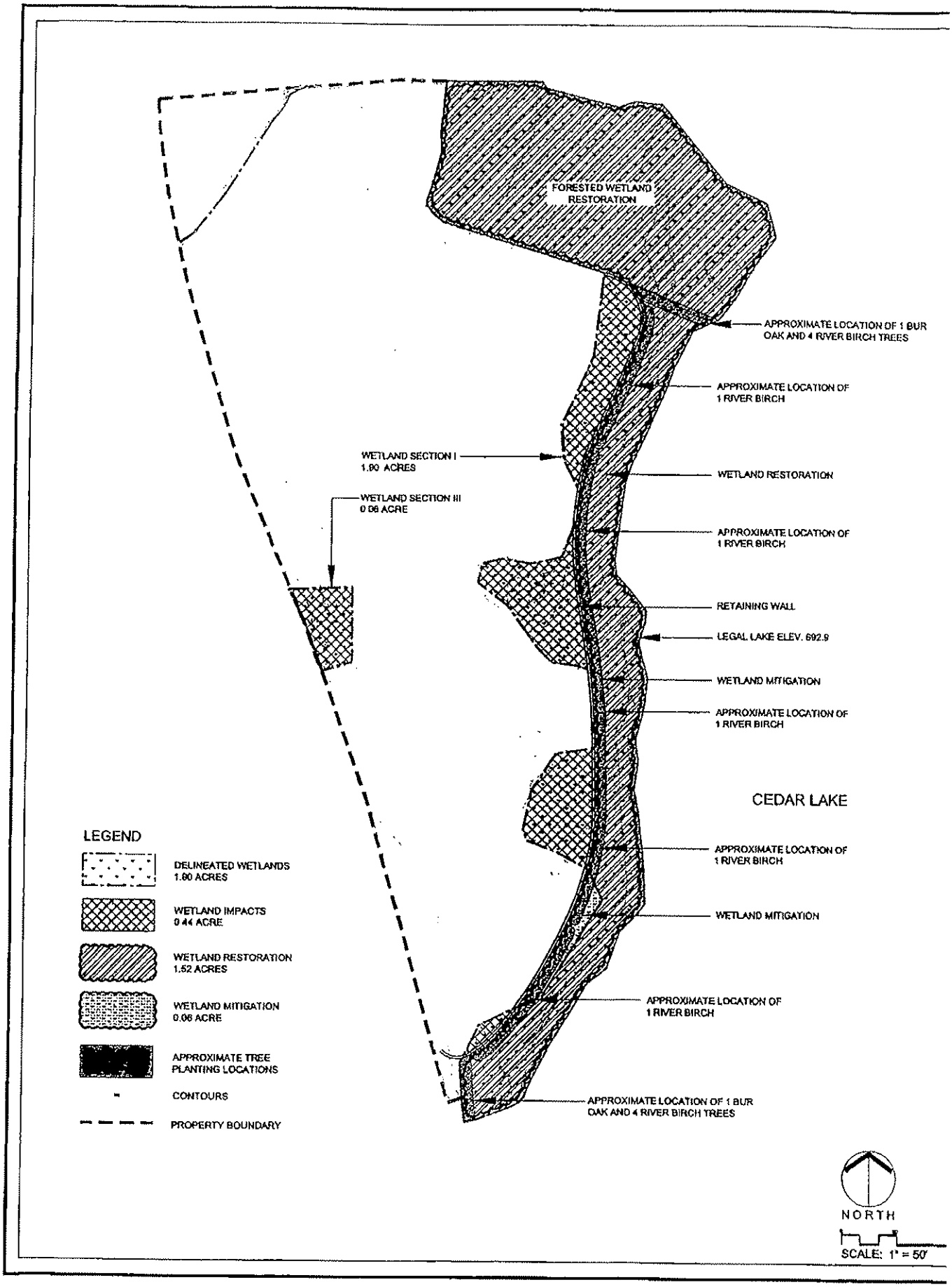
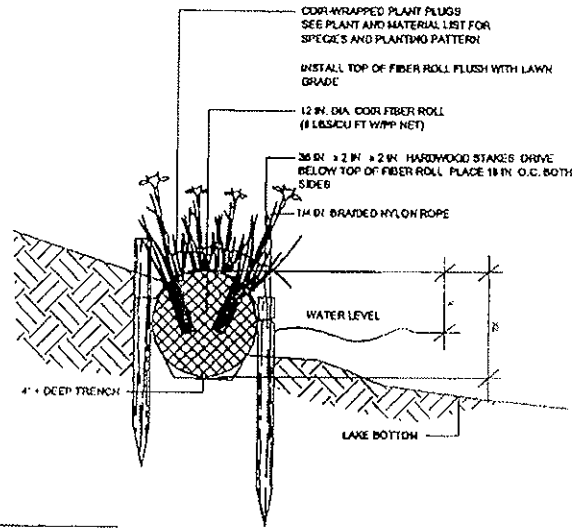

FORESTED WETLAND RESTORATION
APPROXIMATE LOCATION OF 1 BUR OAK AND 4 RIVER BIRCH TREES
APPROXIMATE LOCATION OF 1 RIVER BIRCH
WETLAND SECTION I 1.90 ACRES
WETLAND RESTORATION
WETLAND SECTION III 0.06 ACRE
APPROXIMATE LOCATION OF 1 RIVER BIRCH
RETAINING WALL
LEGAL LAKE ELEV. 692.9
WETLAND MITIGATION
APPROXIMATE LOCATION OF 1 RIVER BIRCH
CEDAR LAKE
APPROXIMATE LOCATION OF 1 RIVER BIRCH
WETLAND MITIGATION
APPROXIMATE LOCATION OF 1 RIVER BIRCH
APPROXIMATE LOCATION OF 1 BUR OAK AND 4 RIVER BIRCH TREES
LEGEND
DELINEATED WETLANDS 1.60 ACRES
WETLAND IMPACTS 0.44 ACRE
WETLAND RESTORATION 1.52 ACRES
WETLAND MITIGATION 0.06 ACRE
APPROXIMATE TREE PLANTING LOCATIONS
CONTOURS
PROPERTY BOUNDARY
NORTH
SCALE: 1" = 50'

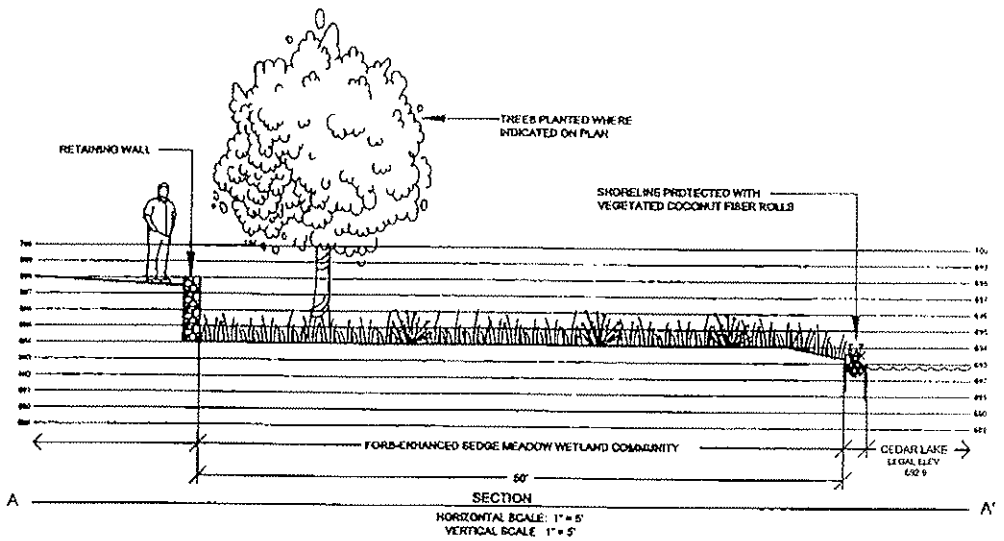
VEGETATED COCONUT FIBER ROLLS

12" diameter, 9 lbs. per cubic ft., 7.5 ft. long pre-vegetated coir log with polypropylene net available from D2 Land & Water (317) 917-2160. See plant list below for specified aquatic plantings within coir log. Install along 750 lineal feet of southernmost shoreline in the wetland restoration area as per Manufacturer's installation instructions.

HERBACEOUS AQUATICS IN PRE-VEGETATED COIR ROLL		
BOTANICAL NAME	COMMON NAME	QTY PER LOG
Carex emoryi	River Bank Tussock Sedge	3
Carex crisatella	Crested Sedge	3
Carex lacustris	Lake Sedge	3
Carex pellita	Broad-Leaved Woolly Sedge	3
Carex stricta	Tussock Sedge	3
Eleocharis erythropoda	Creeping Spike Rush	3
Iris virginica shrevei	Blue Flag Iris	3



1 COCONUT FIBER ROLL INSTALLATION DETAIL
NOT TO SCALE



2 TYPICAL CROSS SECTION OF WETLAND MITIGATION

Midwestern Sedge Meadow Mix (WP2)

Approximate mix weight/acre 38 LBS

40.0% Graminoids 35.2% Forbs, 24.8% Temp Cover Grasses

Scientific Name	Common Name	% Seed
Graminoids		
Calamagrostis canadensis	Blue Joint Grass	4.84%
Carex comosa	Bearded Sedge	1.56%
Carex crinita	Fringed Sedge	3.00%
Carex crisatella	Crested Sedge	6.92%
Carex frankii	Frank's Sedge	1.81%
Carex granularis	Meadow Sedge	0.45%
Carex lupulina	Hop Sedge	2.32%
Carex lurida	Shallow Sedge	1.84%
Carex tribuloides	Blunt Broom Sedge	2.76%
Carex vulpinoidea	Fox Sedge	5.49%
Eleocharis palustris	Creeping Spike Rush	3.40%
Juncus effusus	Soft Rush	10.69%
Leersia oryzoides	Rice Cut Grass	4.63%
Panicum virgatum	Switch Grass	1.84%
Scirpus atrovirens	Dark Green Bulrush	14.37%
Scirpus cyperinus	Woolgrass	15.80%
Scirpus pendulus	Drooping Bulrush	6.81%
Scirpus validus	Softstem Bulrush	2.48%
Spartina pectinata	Prairie Cord Grass	0.81%
		100.00%
Forbs		
Alisma subcordatum	Subcordate Water Plantain	6.84%
Asclepias incarnata	Swamp Milkweed	0.59%
Aster novae-angliae	New England Aster	1.00%
Aster puniceus	Swamp Aster	2.13%
Aster puniceus firmus	Shining Aster	2.13%
Bidens cernua	Nodding Beggar-Ticks	2.19%
Eupatorium maculatum	Spotted Joe Pye Weed	4.64%
Eupatorium perfoliatum	Common Boneset	3.71%
Helenium autumnale	Common Sneezeweed	7.64%
Iris virginica shrevei	Blue Flag Iris	0.23%
Lobelia cardinalis	Cardinal Flower	4.63%
Lobelia siphilitica	Great Blue Lobelia	5.86%
Ludwigia alternifolia	Bushy Seedbox	0.67%
Mimulus ringens	Allegheny Monkey Flower	18.60%
Penthorum sedoides	Ditch Stonecrop	14.84%
Physostegia virginiana	Obedient Plant	9.60%
Sagittaria latifolia	Broad-Leaf Arrowhead	4.67%
Senna hebecarpa	Wild Senna	0.17%
Solidago riddellii	Riddell's Goldenrod	0.07%
Thelypteris palustris	Purple Meadow Rue	0.44%
Verbena hastata	Blue Vervain	0.18%
Vernonia gigantea	Tall Ironweed	1.44%
		100.00%
Temporary Cover Grasses		
Agrostis alba palustris	Creeping Bentgrass	54.16%
Avena sativa	Seed Oats	45.84%
		100.00%

3 SEDGE MEADOW SEED MIX SPECIFICATIONS

Earth Source

LAKE SHORE VILLAGE

Cedar Lake, Lake County, Indiana

WETLAND RESTORATION & MITIGATION PLAN

DANIEL A. ERNS REGISTERED No. 930011 STATE OF INDIANA LANDSCAPE ARCHITECT

date: 5/23/08	
checked by:	date:
drawn by:	date:
ASW	11/28/07
revisions:	date:
ASW	12/18/07
ASW	1/10/08
ASW	5/13/08

file name: Cedar Lake_Mitigation.dwg

project no: 07050386

SHEET 1 OF 1